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Description

[Large Gauge Pneumatic Launcher]

Background of Invention

[0001] Since the 1970's, paintball has developed from an occasional survival type recreational sport, enjoyed by a few players into a very well developed, world-wide industry and culture. More than 9 million people will participate in paintball related activities in 2004. The evolution of paintball guns, usually referred to as markers, has become more technological with an emphasis on rate of fire, weight reduction, electronics accessories and mechanisms, and accessories.

[0002] Paintball markers shoot individual spherical rounds in calibers of approximately .068, at varied rates of fire, and at velocities of approximately 300 feet/per second. One area of interest to paintball participants has always been the use of personal and team artillery. However, the industry has not provided a valve assembly the industry has not provided a valve or valve assembly that enables large gauge projectiles of more than 35mm to be safely and

launched from a light-weight launching system at gas pressures of 500-800 psi. Nor, has the industry developed a large gauge launcher that can utilize a host marker's supply of compressed gas so that a separate air or gas source is not required.

[0003] The arena of Non-lethal Weapon deployment has developed in parallel evolution to the paintball industry, where a frangible, spherical ball, filled with a substance that renders the targeted person, or persons temporarily incapacitated. Paintball markers and similar launchers have been employed in the projection of small gauge ammunition of approximate calibers of .068.

[0004] The present invention presents a new innovation to both the paintball and Non-Lethal Weapon industries, where the possibility of a large gauge launcher may be attached to a host marker of any make or model, as an "under-barrel" secondary weapon, utilizing the host marker's supply of compressed air, and fires large gauge rounds of ammunition at targets, while not inhibiting the normal operation of the host marker. The innovative valve assembly may also be used in both said industries, as a trigger mechanism for otherwise self contained weapons, where a supply of air is provided from a source other than the

marker, such as on an air cannon or other launching system.

Summary of Invention

[0005] The main object of the invention is to provide an underbarrel, large gauge option to paintball competitors and NLW operators, which easily adapts to existing paintball markers, utilizing the host marker's compressed gas in such a manner that the marker continues to normally operate as it is designed.

[0006] The invention is a large gauge projectile launching apparatus consisting of six principle elements: a universal connector, or other port component to access a host marker's compressed gas, a pressure chamber to store a specific volume of compressed gas and, in the case of CO2 gas, acts as an additional expansion chamber, a valve chassis that contains the valve mechanism, a valve that serves as a trigger mechanism and actuator, a diverter disc that evenly disperses vented gas into the barrel, and a barrel which stores a projectile and directs it to the intended target.

[0007] The present invention is immediately adaptable to most known markers, without major redesign or retrofitting. It does not require designated hard points, as does the

M203 grenade launcher and similar M203-type pneumatic launchers, such as Tippmann's EGL-47 launcher. The invention is quite distinguished from other apparatuses in its ability to almost universally attach to most popular paintball markers on the market today. It is completely adaptable as an under barrel launcher to every paintball marker on the market though either the standard Universal Connector, or a marker-specific or custom retrofitted connector.

[0008] The invention offers the rapidly growing paintball and NLW markets an affordable, safe and easy to operate, large gauge launcher option, with out the need to purchase a specific marker or gun, or expensive custom retrofit.

[0009] The invention may also serve as a self-contained launcher, when attached directly to a separate source of compressed gas. This could be useful when a paintball marker is not needed and a large gauge projectile is desired. For example, the self-contained launcher could be constructed and fitted in a turret positioned on top of, or inside an armored police vehicle to fire NLW rounds during a riot or other disturbance, where a source of regulated pressured gas is secured inside the vehicle.

[0010] The second primary object of the invention is to provide a valve design that may become useful in the development of safe to operate pneumatic launchers such as cannons or other projectile launchers of varied design and purpose. Until now, the typical valve utilized in launchers was an expensive or difficult to operate ball valve, or solenoid valve, that could safely operate at pressures of up to a maximum 200 psi. The Warnock Valve and Warnock Valve Chassis combination presents a design that can be resized to meet the specific need of a developer requiring an air pressure of 200-1000 psi, or more.

Brief Description of Drawings

[0011] Fig. 1 is a left side view in elevation of the large gauge pneumatic launcher and the components of the present invention which is normally mounted beneath the barrel of a paintball marker.

[0012] Fig. 2 is an exploded 3D elevation of said launcher and its components.

[0013] Fig. 3 is a diagrammatic cross sectional (Section A-A) view from the left side elevation of said launcher and its components.

[0014] Fig. 4 is a diagrammatic cross sectional (Section B-B) view from the bottom side elevation of said launcher and its

components.

[0015] FIG. 5 is a pressure end in elevation 3D view of the Warnock Valve Chassis.

[0016] Fig. 6 is an exhaust end in elevation 3D view of the Warnock Valve Chassis.

[0017] FIG. 7 is a diagrammatic cross sectional (Section C-C) exhaust end view of the Warnock Valve Chassis with the Warnock Valve in the closed position.

[0018] FIG. 8 is a composite diagram revealing all of the bores and orifices from the exhaust end view of the Warnock Valve Chassis with the Warnock Valve in the open position.

DETAILED DESCRIPTION

[0019] The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes contemplated by the inventor of carrying out his invention. Various modifications, however, will remain readily apparent to those skilled in the art, since the general principles of the present invention have been defined herein specifically to provide a large gauge pneumatic launcher.

[0020] Figure 1 presents a left side view in elevation of the large gauge pneumatic launcher which is normally attached to a

paintball marker in the position under the primary paintball barrel. The launcher in its entirety is manufactured from very light-weight state-of the art materials and provides a paintball competitor or employer of Non-Lethal Weapons (such as a projectile containing oleoresin capsicum, or other incapacitating chemical) the option of shooting a projectile larger than the standard sized projectile, while continuing normal operation of the standard sized projectile launcher, usually referred to as a "marker" or paintball gun. The invention is attached to a port on the marker, or attached to a port created by retrofitting a host marker, thereby accessing the compressed gas contained in or attached to the host marker.

[0021] Figure 2 is an exploded view of the marker and its components as designed within the scope of the primary function of the invention. Fig. 2 shows a diagram of a Universal LP Connector 2 which has a threaded end and O ring 1 and a threaded end that connects the Connector to the Pressure Chamber 5 through the female threaded fitting 4.

[0022] The Warnock Valve Chassis 9 is connected to the pressure chamber on the pressure chamber side (or air input side) of the Warnock Valve Chassis and seated between the

Pressure Chamber 5 and the Warnock Valve Chassis 9 is the pressure O ring 8.

[0023] The Warnock Valve 19 is a spool valve with multiple O rings 18 which form a seal to contain fluid flowing from the host marker via the Universal LP Connector 2 and normally stored in the Pressure Chamber 5. A compression spring 17 is seated on the spring stem (right side of valve as drawn) of the Warnock Valve 19 within the Warnock Valve Chassis 9 and aids in resetting the Warnock Valve 19 after actuation.

[0024] The Warnock Valve 19 is actuated by pressing the valve stem (left end as drawn). The Warnock Valve is normally in the closed position, and after actuation into the open position, the valve is reset to the closed position by the compression spring 17.

[0025] Figure 5 shows a 3D shaded perspective of the pressure end of the Warnock Valve Chassis 9. The Warnock Valve 19 enters the Warnock Valve Chassis 9 through the valve bore 12. The Warnock Valve 9 is held into correct position by seating a set screw 6 into the threaded set screw orifice 7 and into the center of the valve bore 12. The set screw forces the Warnock Valve 19 to rest in closed position while under pressure from the compression spring

17. The Warnock Valve's 19 spring stem momentarily protrudes through the spring stem orifice FIG. 6 #13 upon actuation, which is along the same axis of the valve bore 12 but a smaller diameter than the valve bore 12, in order to contain the compression spring 17 and permit a longer axial movement of the Warnock Valve 19.

[0026] Figure 5 also depicts the air input ports 10 which allow fluid flow from the pressure chamber to enter into the Warnock Valve Chassis 9 and contained therein when the Warnock Valve 19 is positioned in the closed position.

[0027] Figure 6 depicts the air output ports 11 (or exhaust ports) on the exhaust end of the Warnock Valve Chassis. A Barrel O ring 14 assists in firmly seating the Barrel 16 onto the Warnock Valve Chassis 9. A Diverter Disc 15 is screwed into the Warnock Valve Chassis 9 side of (right side as drawn) the Barrel 16. The Diverter Disc 15 has multiple ports which directs the flow of fluid from the air output ports 11 (which are positioned off- center in the Warnock Valve Chassis) more evenly into the Barrel 16, aiding in a correct thrust pattern when applied to a projectile that may be launched from the invention.

[0028] Figure 3 is a diagrammatic cross sectional (Section A-A) view from the left side elevation of the present invention

and its components. Figure 4 is a diagrammatic cross sectional (Section B-B) view from the bottom side elevation of said invention and its components.

[0029] Figure 7 is a diagrammatic cross sectional (Section C-C) exhaust end view of the Warnock Valve Chassis 9 with the Warnock Valve 19 in the closed position. Figure 8 presents a composite diagram revealing the bores and orifices from the exhaust end view of the Warnock Valve Chassis 9 with the Warnock Valve 19 in the open position. This perspective reveals how the air input ports 10 and the air output ports 11 align within the Warnock Valve Chassis 9, in order to vent fluid contained in the pressure chamber 5 and sub sequentially into and through the Barrel 16.

[0030] The invention is designed to access compressed air from the host marker via the Universal LP Connector as described above, and permit fluid flow through the Air Inlet Orifice 3 into the Pressure Chamber 5. The movement of fluid past the pressure chamber is controlled by the Warnock Valve 19 housed within the Warnock Valve Chassis 9. After actuation of the Warnock Valve 19 by pressing the actuating stem of the Warnock Valve 19 into the open position (as seen in Fig. 8), fluid passed from the air inlet orifice 3 into the pressure chamber 5, then into the air in-

put ports 10, through the air output ports 11, through the ports in the diverter disc 15 and into the barrel 16, in order to launch a large gauge projectile from the present invention.

[0031] This detailed description as presented reveals components and the proper sequence in a normal embodiment of the invention, but does not demonstrate all possible embodiments of the Warnock Valve 19 and the Warnock Valve Chassis 9, nor does it present, as herein described, all possible embodiments of the invention.

[0032] This invention is susceptible to considerable variations in cosmetic, valve design modifications and methods of accessing fluid from the host marker, without departing from the spirit of the present invention. The detailed description is not intended to limit and should not be construed as limiting the invention to the particular exemplifications presented hereinabove. Rather, what is intended to be established is set forth in the scope of the presented claims.